References.

Annandale, N., 'Notes on the Darjiling Skink (*Lygosoma sikkimense*)', *Rec. Ind. Mus.*, V, p. 201, (1910).

Boulenger, G. A., Reptilia and Batrachia, *Fauna of Brit. India,* (1890).

Gadow, H., Amphibia and Reptiles, *Cambridge Nat. Hist.*, viii, (1901).

Kerr, G. J., Text-book of Embryology, vol. ii, Vertebrata with the exception of Mammalia, (1919).

McCann, C., 'A Reptile and Amphibian Miscellany', Pt. ii, *Journ. Bombay Nat. Hist. Soc.,* xlii, pp. 46-64, (1940).

Okada, Y., 'Reptile of Jehol', *Rep. 1st Sci. Expdt. Manchoukuo,* sec. V, pt. II, Art. 2, p. 56, (1935).

Sedgwick, A., A Student's Text-book of Zoology, vol. ii, (1905).

Smith, M. A., Reptilia and Amphibia, vol. ii—Sauria, *Fauna of Brit. India* (1935).

Since the above article was written and accepted for publication in this *Journal* on April 6, 1943, I have come across a short note on the same subject [An instance of 'viviparity' in *Mabuya carinata* (Schneid.)] written by Mr. R. V. Seshaiya and published in 1938 (*J.B.N.H.S.*, 40, p. 132, 1938). I regret very much to have missed referring to this article. As my observations are considerably different from his brief account, although the conclusion is somewhat alike, I do not like to alter the text of my article. A brief comment may, however, be made here. Mr. Seshaiya did not record, *inter alia,* the number of eggs that were actually present in the uteri and the time of breeding, nor did he add a description of the embryos except that they superficially resembled a 3-day-old chick embryo. It appears that the embryos obtained by him were certainly in much earlier stages of development than those recorded by me above.

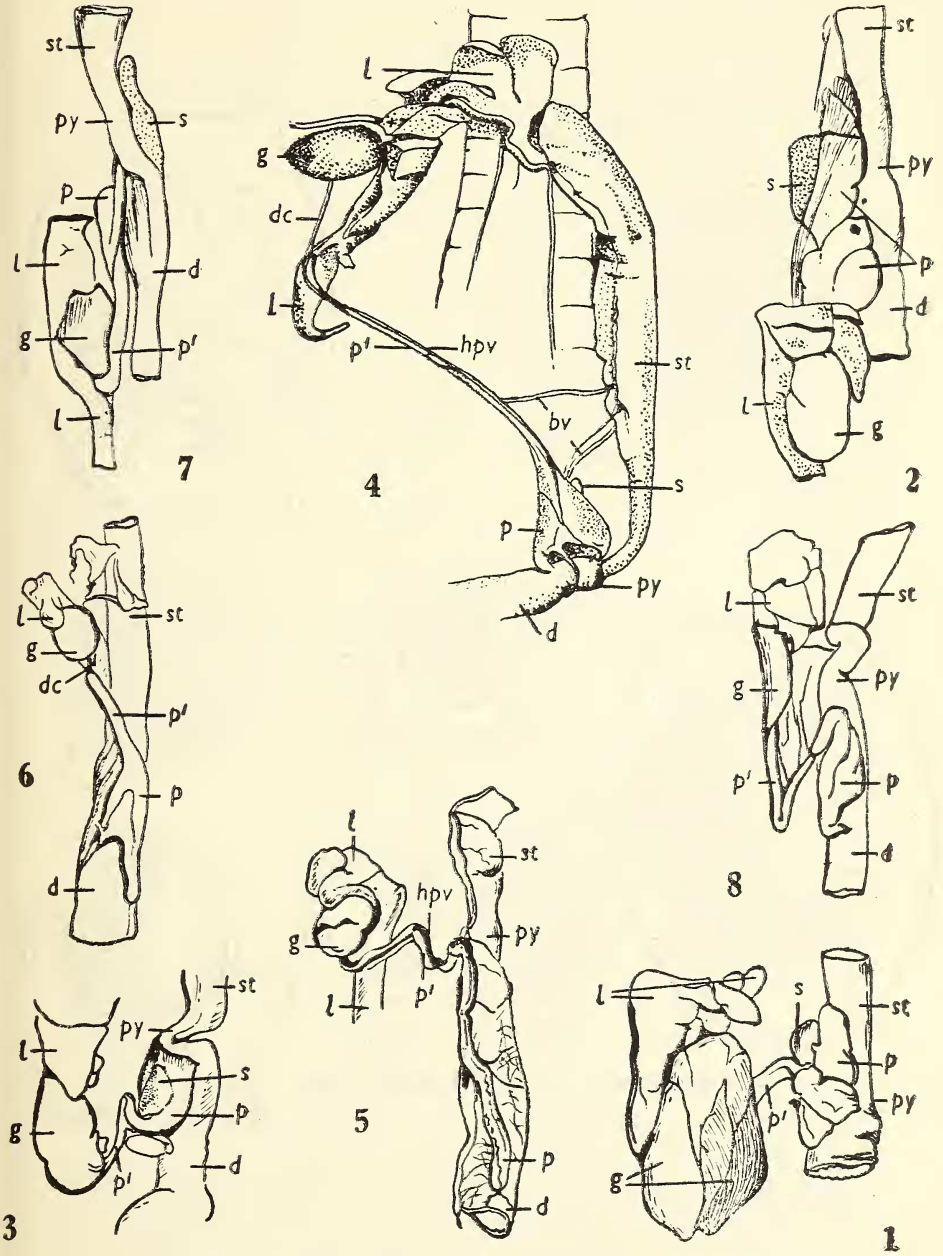
Zoological Dept., University of Calcutta, J. L. B.
35, Ballygunge Circular Road,
Calcutta,
April 28, 1943.

XVIII.—THE ANATOMY OF THE DUODENAL REGION OF SOME GENERA OF APODA (AMPHIBIA).

(*With two plates*)

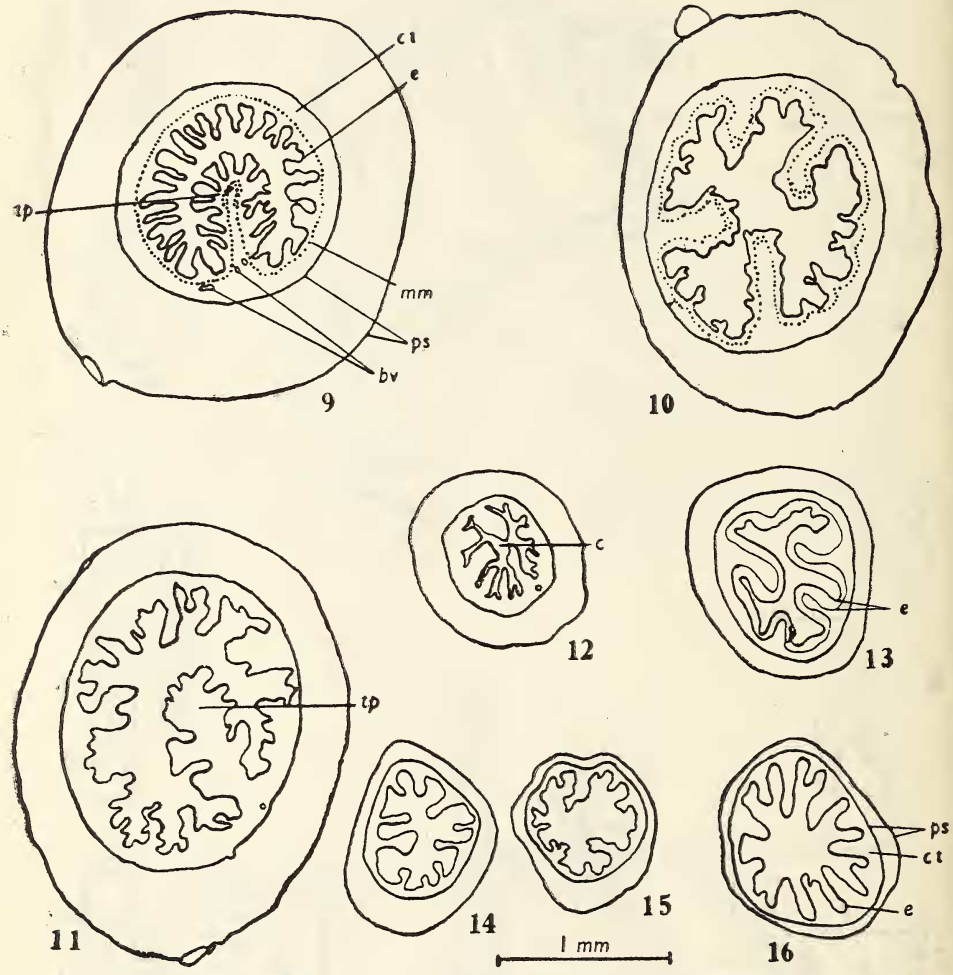
A comparative study of the duodenal region of some apodan genera was made to note the opening of the hepatic and pancreatic ducts.

In *Anura,* it is common knowledge that the hepatic ducts arising from the liver lobes unite to form a common hepatic duct with which one of the cystic ducts coming from the gall bladder merges to form the ductus choledocus. The other cystic duct opens into the common hepatic duct entering the pancreas. Entering into the choledocal duct, there is a duct (as shown by Wiedersheim) from



L. S. Ramaswami—Anatomy of duodenal region of Apoda.

(For explanation see end of note).



L. S. Ramaswami—Anatomy of duodenal region of Apoda.

(For explanation see end of note).

the pancreas formed by the union of small ductules. O'Donoghue (1925, p. 47) described many small pancreatic ductules opening into the hepatic duct. The choledocal duct enters the duodenum. There are no separate pancreatic ducts, therefore, opening into the intestine.

On the other hand, in *Urodela,* the pancreas throws its secretion into the duodenum by two ducts; of these the anterior opens behind the pylorus and the posterior along with the hepatic duct (Noble, 1931, p. 205). It is noted that the duct corresponding to the anterior one of the *Urodela* disappears in *Anura* (Göppert, 1891); the other opens into the ductus choledocus.

I have examined the duodenal region of the following examples of Apoda both by dissection and by sectioning:—

Ichthyophis glutinosus (Linné); *I. monochrous* (Bleek.); *Gegenophis carnosus* (Beddome); *Ureotyphlus narayani* Seshachar; *Dermophis gregorii* Blgr.; *Boulengerula boulengeri* Torn.; *Herpele ochrocephala* (Cope) and *Scolecomorphus uluguruensis* Barb & Lov.

The gall bladder (text-figs. 1-8, *g.*) situated at the posterior end of the lobulated liver (*l.*) can be clearly seen in a ventral dissection. The cystic duct arising from the dorsal aspect of it joins the large hepatic duct coming from the liver. Opening into the latter are a few hepatic ductules. The ductus choledocus (text-figs. 4, 6, *dc.*) passes through the tissue of the pancreas (p^1., *p.*) (the anterior limb of which is situated near the liver) closely associated with the hepatic portal vein (*hpv.*).

The larger part of the pancreas (text-figs. 1-8, *p.*) is associated with the duodenal part (*d.*) of the intestine and it is in this region, i.e. posterior to the pylorus (*py.*) that the openings of the common hepatic and pancreatic ducts are noticed. Tracing sections from the pyloric end, in all the examples studied, a large duct arising from the pancreas opens into the intestine, which therefore, would correspond with the anterior duct of Urodela. In her figure 76 (Pl. xxii) Francis (1934) described the anterior as dorsal duct in *Salamandra.* However, in two examples of Apoda studied by me (*Scolecomorphus, Ureotyphlus*) another smaller pancreatic duct gains entry into the intestine (which may therefore, be called second anterior) before the choledocal duct opens into the gut. Posterior to this choledocal opening, the intestine receives the second or posterior pancreatic duct. In *Dermophis* the posterior pancreatic and choledocal ducts unite before opening. In *Salamandra* also, Francis (1934) described the posterior duct opening into the duodenum by two ductules, one anterior and the other posterior to the common bile duct.

The difference between the anuran and apodan gall bladder is at once apparent. While in the former there is a cystic duct to lead bile into gall bladder from which duct there is another to throw the juice into the choledocal duct, in Apoda, on the other hand, the gall bladder is merely an enlargement of the hepatic duct corresponding to the first type shown by Kingsley (1926, p. 259, fig. 284).

The presence of double independent pancreatic ducts opening into duodenum would naturally relate the Apoda more with Urodela than with Anura.